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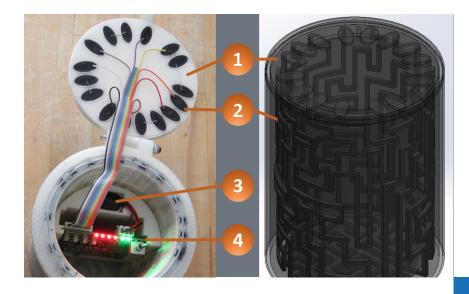
Title: ADDITIVELY MANUFACTURED TAMPER EVIDENT CONTAINER (TEC)

Author(s): Bernardin, John David

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Tech Snapshot Manufacturing

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ADDITIVELY MANUFACTURED TAMPER EVIDENT CONTAINER (TEC)

Persistent protection of sensitive assets and data from adversarial disclosure



SUMMARY

Researchers at Los Alamos National Laboratory have developed a tamper evident container (TEC) to secure a broad variety of items from adversarial disclosure and espionage accidents. The new technology uses additive-manufacturing (AM) techniques for the concurrent creation of a container and arbitrarily complex-shaped three-dimensional tamper-sensitive features within its walls that authenticate the package. Analog and encrypted digital boards safely stored inside the TEC permanently record the complete security history of the protected items. Los Alamos is seeking commercial partners interested in further development and engineering prototype work.



MARKET APPLICATION

The TEC has applications in both the commercial and government sectors where ensuring the authenticity and safekeeping of sensitive physical articles, accountable items, and confidential information is of crucial importance. Use applications include secure storage and transportation of corporate intellectual property, monetary amounts, forensic evidence, bio specimen, nuclear material, weapons and classified components. TEC simultaneously enables 1) the creation of more secure tamper evident containers, 2) improved design flexibility, and 3) manufacturing automation. These features are essential to promptly and effectively respond to the high-security demands of industries and organizations operating on the constantly-evolving world stage. This technology can be widely adopted to mitigate the risks of counterfeit products and fake data to which the modern society is increasingly exposed. The TEC can incorporate alarming and protective measures to rapidly report and/or take action should its integrity be violated.

BENEFITS

The dense in-wall network of tamper-sensitive features offers unseen breach detection capabilities across and throughout the whole container.

- Additive Manufacturing (AM) enables endless design configurations and scalability
- Technology transferable to many AM components for other applications
- Manufacturing technologies are readily available for rapid and agile production
- AM feedstock and commercial parts are readily available and affordable
- Electrically conductive filaments and active electronics enable instant tampering detection
- Tunable container geometry and material composition
- Each container can be uniquely encrypted both physically (detection traces) and functionally (digital)

CONTACT

Ross Muenchausen rossm@lanl.gov 505-664-0558





WHY WE ARE BUILDING ADDITIVELY MANUFACTURED TAMPER EVIDENT CONTAINER (TEC)

The technology developed at Los Alamos equips additively manufactured containers and components with tamper- evident capabilities. The additively manufacturing technology and material compositions used at Los Alamos inherently offer guarantees of property tunability and non-reproducibility for each container. The use of programmable analog and digital circuit boards stored inside the TEC provides low-power means for self-authentication and continuous self-state-of-health awareness.



WHAT'S BEHIND OUR TECHNOLOGY

This new technology introduces a paradigm shift in the tamper evident container industry as the container itself is tamper-sensitive. Additively manufacturing technology is used to embed electrical conductive filaments throughout the container's wall. The filaments are sensitive to tampering and their integrity can be constantly monitored. Furthermore, the TEC's electronics have the potential to immediately alert the container owner upon TEC violation.



OUR COMPETITIVE ADVANTAGES

Current tamper evident solutions consist in adding a separate tamper evident seal to a product (e.g. seal applied to a food container lid or medicine bottle). The technology developed at Los Alamos incorporates a dense in-wall network of tamper-sensitive features that offers unseen breach detection capabilities across and throughout the whole container. This is a clear advantage over current tamper evident solutions that only protect a single or a few points of a container.



OUR TECHNOLOGY STATUS

Two functional TEC prototypes have been produced and demonstrated. One prototype has been used to successfully verify tampering-sensitive methods alternative to the embedded conductive filaments. The team is in the process of setting up meetings with interested Program Managers from across the Laboratory to describe the patent and the functional prototypes. Los Alamos is seeking commercial partners interested in further development and engineering prototype work.



PUBLICATIONS AND IP

S133634.001 "ADDITIVELY MANUFACTURED TAMPER EVIDENT CONTAINER", Bernardin, John D.; Marchi, Alexandria N.; Mascareñas, David D.L.; Cattaneo, Alessandro; Gioia, Jack; US Pat. Appl. No. 16/509433 Appl. Date 07/11/2019.

